

Trans-Lake Washington Project EIS

Methodology Report – 6/10/02

Transportation

Guiding Plans and Policies

- Title 49, Code of Federal Regulations, Part 236, Transportation – Rules, Standards and Instructions: Signal Systems.
- Washington State Growth Management Act, RCW 36.70A.070, 1990-91 , related to level of service standards and concurrency of land development and transportation improvements.
- City of Seattle Comprehensive Transportation Plan and Concurrency Management System, which requires preparation of a transportation impact study and consideration of mitigation strategies for development generating peak hour trips above a specified threshold.
- Washington State Department of Transportation (WSDOT), *Washington State Multi-Modal Transportation Plan*, 1994.
- Puget Sound Regional Council (PSRC), *Destination 2030*, 2001.
- Cities of Seattle, Bellevue, Redmond, Clyde Hill, Medina, Hunts Point, Yarrow Point, and Kirkland, *Comprehensive and/or Transportation Plan; 6-Year Transportation Improvement Programs*.
- U.S. Department of Transportation, Federal Highway Administration, *Highway Capacity Manual*, 2000.
- American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*, 2001.
- Manual of Uniform Traffic Control Devices (MUTCD), 2000.
- WSDOT Design Manual, 2002.
- WSDOT Environmental Procedures Manual, Section 460, July 2001.

Data Needs and Sources

- Recent (2002) traffic count data and traffic counts at new locations will be collected by the transportation team for the year 2030 traffic volume generation effort.
- Intersection signal timing plans will be collected from the various jurisdictions for the intersections that will be included in the project evaluation.

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- Existing intersection and freeway geometric data will be collected in field visits and/or gathered from the design team.
 - Current adopted comprehensive plans for the cities of Seattle, Medina, Hunts Point, Yarrow Point, Clyde Hill, Kirkland, Bellevue, and Redmond. The environmental team has a copy of each jurisdiction's plans. Comprehensive plan amendments for 2001 will be reviewed to ensure that the most current information is being analyzed. It is assumed that any amendments and updates will be provided upon request by the planning departments of the identified cities or will be available on the internet.
 - Current adopted neighborhood plans for recognized neighborhoods in the study area. The environmental team currently has all necessary neighborhood plans. It is assumed that any amendments and updates will be provided upon request by the planning departments of the identified cities or will be available on the internet. Field reconnaissance also will be conducted to study the layout of the respective neighborhoods.
 - The principal source for the systemwide analysis will be derived from the PSRC model output for auto trips for the base year (1998) and future year 2030.
 - Updated jurisdictional transit and pedestrian/bicycle plans.

Proposed Coordination with Agencies

Agencies will be contacted for information on traffic issues and operational information. Telephone contact and/or face-to-face meetings with city staff will occur to supplement information obtained from planning documents. Traffic planning and operations departments of those agencies will include:

- City of Seattle
- City of Medina
- Town of Hunts Point
- Town of Yarrow Point
- City of Clyde Hill
- City of Kirkland
- City of Bellevue
- City of Redmond
- King County Metro
- University of Washington

Additionally, PSRC will be contacted to supplement background transportation and land use information as needed.

Proposed Coordination with Team, WSDOT, and Sound Transit

To assess traffic impacts, close coordination will be required with the following team leads:

- Design – need to know how various alternative designs will affect the traffic distribution through or around local intersections.

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- Transportation – need to have a clear understanding of the transportation planning model's output with respect to trip distribution, mode choice, and transit ridership.

Coordination with WSDOT and Sound Transit staff will occur at weekly traffic operations meetings and via telephone contact. In-person meetings to discuss critical issues will be coordinated with the appropriate staff.

Study Area

The study area includes freeway and local intersections within the area defined as follows: I-5 between NE 45th Street and the I-90 collector/distributor ramps, SR 520 between I-5 and Avondale/Redmond Way, and I-405 between NE 70th Street and NE 4th Street.

Traffic operations analysis will be performed at the on- and off-ramps to the freeway system and at local intersections near the interchanges.

Affected Environment Methodology

Regional Highways

The primary performance measure that will be used to describe existing conditions for critical highway segments is the vehicle volume-to-capacity (v/c) ratio, or the ratio of demand flow rate to capacity for a traffic facility. The Congestion Management System Baseline – System Performance Report (PSRC 1998) provides current v/c data on regional conditions. Capacity deficiencies are identified if a v/c of 0.9 is exceeded.

Freeway safety data will be summarized to include the past 3 years of available accident data along the SR 520 corridor.

Local Roadways

A description of the local roadway that would be affected by the Trans-Lake Washington Project will include roadway physical characteristics, traffic volumes, and accident data. Local traffic operations will be described using the existing traffic volume count data and existing intersection queue data to develop an operational analysis. A summary of peak hour operational analysis will include traffic volume turning movements, average intersection level of service, average intersection delay, intersection v/c ratio and critical queue locations. Intersection analysis results will be included in the report appendix.

Intersections that will be evaluated are included in the attached traffic data list.

Parking

An inventory of local parking in areas that are likely to be impacted by future Trans-Lake Washington Project alternatives will be summarized. These areas include, but are not limited to, park-and-ride lots, the University of Washington Husky Stadium parking area, the Triangle Underground Parking Garage, the Montlake neighborhood, Boylston Avenue East, Bellevue Way interchange area, and Northup Way NE.

Bicycle and Pedestrian

Existing bicycle and pedestrian facilities will be inventoried within the Trans-Lake Washington Project study area. These nonmotorized facilities will be described by function

within the communities and region. Inventory will include the missing sections of sidewalk, exclusive nonmotorized bicycle and pedestrian pathways, and combined roadway bicycle pathways.

This section will also address the plans for completion of regional nonmotorized facilities.

Transit Service

Existing transit service along the SR 520 corridor will be summarized with a listing of the routes and their frequency during the peak and off-peak periods. Transit service will also be summarized with transit ridership information. Metro Transit, Community Transit, the City of Seattle, and Sound Transit provide public transit in the study area.

Freight Movement

Freeways, local roadways, and rail lines throughout the study area are vital to the movement of freight and goods between major transportation hubs such as the Port of Seattle and Sea-Tac Airport and numerous business and customer destinations. Freight and goods movement within the study area generally comprises two transportation modes: trucks on roadways or rail on local mainline and spur tracks. Both transportation modes and their existing uses will be described. A third freight transportation mode uses navigable waterways. Navigable waterways will be addressed in a separate chapter in the EIS.

Transportation Demand Management (TDM)

Existing TDM programs within the Trans-Lake Washington Project study area, such as the University of Washington's U-Pass program and Commute Trip Reduction (CTR) programs (and other TDM programs) in the local jurisdictions will be described. The major origins and destinations for corridor trips will also be described in relationship to the focus of the proposed TDM programs.

Environmental Consequences Analysis Methodology

Direct Impacts

Regional Highways

Analysis of impacts on traffic along the regional highways will consider factors such as congestion or changes in capacity and changes in circulation or traffic patterns, including the potential for traffic diversion to different interchanges. Traffic on the regional highways is typically controlled by conflict points at ramp merge, diverge, and weaving sections.

Analysis of the interchanges will be provided for the AM and PM peak periods, which will be between the hours of 5:30 and 10:00 AM and 3:00 to 7:30 PM, respectively. Analysis results for the peak three hour period will be summarized in the EIS. The CORSIM model will be used to evaluate the regional highways in the various segments. The segments that will be evaluated are as follows:

- I-5 – Between NE 45th Street and the I-90 collector/distributor ramps
- I-5 Express Lanes – Between I-5 mainline entrance and I-5 mainline exit
- I-405 – Between NE 70th Street and NE 4th Street

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- SR 520 – Between the SR 520 mid-span bridge to I-5
 - SR 520 – Between NE 51st Street/NE 40th Street collector/distributor to the SR 520 mid-span bridge
 - SR 520 – Between West Lake Sammamish to SR 202/Avondale Road

Operational performance of the regional highways will be documented and will include measures of effectiveness for the GP and HOV lanes such as traffic volume, v/c ratio, average speed, average travel time, person throughput, and queuing.

Local Roadways

The analysis of impacts on traffic along surface streets will consider factors such as congestion or changes in capacity; changes in circulation or traffic patterns, including the potential for traffic diversion into neighborhoods; and impacts on nonmotorized facilities.

Traffic operations on surface streets are generally controlled by the intersections along any given route.

Analyses of key intersections will be provided for AM and PM peak hour conditions.

Generally, *Highway Capacity Manual* methodologies will be followed for analysis of intersections, using the Synchro traffic model. Impacts on traffic progression will be evaluated at select locations using SimTraffic to address traffic operations along a corridor or within a multiple intersection grid.

Existing conditions at all key intersections will be evaluated using traffic data collected at the outset of the project. Year 2030 AM and PM peak hour conditions for the No Action Alternative will be determined at all key intersections, using No Action Alternative traffic volumes derived from growth-factored increases of existing (1998) counts. Traffic forecasts will be adjusted using travel demand models to reflect new travel patterns resulting from committed projects and/or changes caused by the Trans-Lake Washington Project alternatives. As appropriate, modifications will be made to these forecasts to reflect road geometrics and other considerations inherent in the various Trans-Lake Washington Project alternatives.

A screening process will be applied to each of the key intersections, using level-of-service (LOS) standards to pinpoint conditions that could result in a change in the level of service at the intersection. No further analysis will be conducted at key intersections where changes in traffic volumes or other conditions are expected to be better than the LOS standard or better than the No Action Alternative. Intersections proposed to be evaluated are included in the attached traffic data list. Using the screening process and level of service analyses for the No Action and build alternatives, a qualitative assessment of changes in surface street traffic circulation patterns will be produced. These changes could include potential diversion of through-traffic to other routes, including neighborhood streets, changes in localized property access, and impacts on general corridor mobility and accessibility for all modes.

The intent of the key intersection analyses is to identify the relative difference in magnitude of local traffic impacts among alternatives and to allow problem areas associated with each alternative to be identified. Intersections identified with operational characteristics worse than No-Action will be analyzed in more detail, including development of mitigation plans.

Parking

Parking impacts will be assessed for each alternative. Footprints of proposed interchange and local designs will be reviewed to identify the number of parking spaces gained or lost in each alternative. Potential mitigation for lost parking will be identified. Parking impacts will include park-and-ride facilities along the SR-520 corridor. The effects on transit ridership and vanpooling will be discussed qualitatively.

Bicycle and Pedestrian

Positive and negative impacts on the non-motorized networks will be evaluated by identifying locations where the existing network would be impacted. This could include, but would not be limited to, locations where non-motorized paths would be required to cross roadways and regional non-motorized facilities would be connected. The safety of bicycle and pedestrian facilities will be addressed in accordance with WSDOT design guidelines. Specific concerns at intersections that are highly used by pedestrians and bicyclist will be discussed with jurisdiction representatives and will be qualitatively assessed in the EIS.

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Transit Service

Modifications to transit service related to the proposed alternatives will be described in this section. Modifications will include a listing of proposed routes and frequencies during the peak and off-peak periods. Transit ridership information will be provided for the alternatives.

Additional quantitative data pertaining to transit travel time for each of the alternatives will be included. Impacts to transit reliability will be described for each alternative.

Freight Movement

Impacts on highway freight movement will be quantitatively described in this section using the primary measures of effectiveness of travel time for each of the alternatives.

Impacts on freight movement by rail will be quantitatively discussed in this section; impacts on freight movement by navigable waterways will be discussed qualitatively in the Navigation chapter.

Transportation Demand Management (TDM)

Effectiveness of the proposed TDM programs for each alternative will be quantified in the EIS.

Indirect Impacts

Indirect impacts of the Trans-Lake Washington Project will be measured by performing a regional and corridor-level traffic impact analysis. The information described in this section will be used to assess the impacts of the proposed alternatives on the overall regional and corridor transportation system.

Output from the travel demand model will be the key data source for this analysis. Criteria to be assessed will include daily vehicle miles and hours of travel and daily vehicle hours of delay for the region as a whole.

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- Vehicle miles of travel (VMT) – Trip table matrices will be multiplied by trip distance to determine the impact of the proposed alternatives on the number of total vehicle miles on the highway system.
 - Vehicle hours of travel (VHT) – Matrices of vehicle trips and travel time per trip will be used to quantify the impact of the proposed alternatives on vehicle hours traveled.
 - The regional model output will be used to compare differences in transit ridership between the various alternatives.

Regional travel data will be presented in a table that compares the effectiveness of the Trans-Lake Washington Project in reducing VMT and VHT.

Trips in the SR 520 corridor are heavily oriented to and from downtown Seattle, although a wide variety of other trip origins and destinations exist. Analysis of corridor-wide traffic impacts will include and be based on a review of existing (1998) and 2030 trip-making between several diverse locations such as Northgate, University District, Capital and First Hill, Downtown Seattle, Bellevue, Redmond, and Kirkland. Trip table aggregations to be provided by the project travel demand model will be used to summarize vehicle trip movements within the corridor (including trips to/from the Seattle central business district) and between the corridor and noncorridor locations. The analysis of traffic impacts in various segments of the corridor will involve comparing projected traffic volumes on the freeway, arterial, and collector street system at selected regional screenlines for each alternative. A map and table will be used to present PM peak hour vehicle trips at these screenline locations. A screenline is an artificial line drawn through several generally parallel roads serving the same or similar patterns of traffic and/or trip origins and destinations. Screenlines are used to assess travel patterns within a corridor or to/from a major regional subarea.

Corridor traffic impacts will be assessed at six screenline locations. These include:

- Mid-span bridge (SR 520 and I-90 bridges)
- SR 520 east of I-405 (SR 520 to Bellevue/Redmond Road)
- SR 520 east of West Lake Sammamish Road (Redmond Way to SR 520)
- Lake Washington Ship Canal (Fremont Bridge to Montlake Bridge – this is a combination of City of Seattle screenlines 5.12, 5.13, and 5.16)
- South of I-90 (East Marginal Way to Rainier Avenue South – this is a combination of City of Seattle screenlines 9.12 and 9.13)
- South of I-90 (118th Avenue SE, I-405, Factoria Boulevard SE, and 150th Avenue SE)

Construction Impacts

A qualitative assessment will be made of impacts on the regional system and major travel movements during the period of freeway construction and local construction. For purposes of this analysis, this discussion will be combined with the analysis of short-term construction impacts on freeway and local traffic circulation.

Mitigation Measure Methodology

Mitigation measures aimed at addressing the systemwide traffic impacts identified above will be developed and reviewed. As appropriate, the mitigation measures will include those measures proposed and/or used in other freeway construction projects in the Pacific Northwest, which could include such actions as the development of temporary express bus service and temporary park-and-ride lots to reduce project-related congestion during the construction period. Mitigation measures identified to address local construction traffic impacts will also be reviewed for their relevancy in addressing regional- and/or corridor-level construction traffic issues.

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